CLAIMS:

1. A superconducting fault current limiter (FCL) component having a superconductor in a non or low-inductive configuration with an axial length, a first end and a second end, the FCL component comprising:

a current-carrying coil made of electrically conductive material having a predetermined number of turns disposed closely adjacent the outer diameter of the superconductor, the coil enclosing the superconductor and extending beyond the first end and extending beyond the second end of the superconductor;

wherein the superconductor element is centered along the center axial line of the current-carrying coil; and

wherein the current-carrying coil is adapted to generate a trigger magnetic field with sufficient strength to cause the superconductor to transition from a superconducting state to a normal resistive state during current limiting.

2. The FCL component as recited in claim 1, wherein the FCL is a superconducting MFCL.

3. The FCL component as recited in claim 1, wherein the superconductor is made of high-temperature superconducting material.

4. The FCL component as recited in claim 3, wherein the high-temperature superconducting material is BSCCO.

5. The FCL component as recited in claim 3, wherein the high-temperature superconducting material is YBCO.

6. The FCL component as recited in claim 1, wherein the trigger magnetic field generated by the the current-carrying coil is essentially uniform within the region of the superconductor.

7. The FCL component as recited in claim 6, wherein the trigger magnetic field generated by the the current-carrying coil has a uniformity of within ±10% within the superconductor region.

8. The FCL component as recited in claim 1, wherein the superconductor is selected from the group consisting of a tube, rod, bar, plate, straight tape, straight wire, bifilar coil.

9. The FCL component as recited in claim 1, wherein the superconductor is a non or low-inductive configuration of a tubular-configured high temperature superconductor.

10. The FCL component as recited in claim 9, wherein the tubular-configured superconductor is at least one non or low-inductive superconductor, the superconductor selected from the group consisting of a tube, rod, bar, plate, straight tape, straight wire and bifilar coil.

11. The FCL component as recited in claim 9, wherein an additional magnetic field is generated by a current-carrying wire disposed along the center axial line of the tubular-configured superconductor.

12. The FCL component as recited in claim 9, wherein an additional magnetic field is generated by a current-carrying foil disposed along the center axial line and concentric with the tubular-configured superconductor.

13. The FCL component as recited in claim 1, wherein the trigger coil is a foil.

14. The FCL component as recited in claim 1, wherein the trigger coil is a solenoid.

15. A method of generating an essentially uniform trigger magnetic field in a fault current limiter having a low inductance superconductor, and having a magnetic field region, and having an outer coil axially disposed outside the superconductor, the method comprising the steps of:

generating a magnetic field from the trigger coil, wherein the magnetic field has sufficient strength to trigger the transition of the superconductor from a superconducting state to a normal resistive state, wherein the superconductor is enveloped by the magnetic field region; and

generating an additional magnetic field for a tubular-configured superconductor by a current-carrying foil being disposed inside the inner diameter and along the center axial line of the superconductor, wherein the current carrying wire or foil has length extending beyond the ends of the superconductor;

wherein the trigger coil extends beyond the ends of the superconductor and wherein the superconductor is disposed along a center axial line of the trigger coil such that the superconductor is situated in the region where magnetic field generated by the trigger coil is essentially uniform.